ATTACHMENT A

~~{TITLE OF INVENTION}~~ [SCREW TIGHT TUBE VICE FRAME]

~~{Application Number: 60/258,967}~~

[FIELD OF THE INVENTION]

~~{Filing Date: 01/02/2001~~

~~Title: Screw Tight Tube Vice Frame~~

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~~CROSS REFERENCE TO RELATED APPLICATIONS~~

~~Not Applicable~~

~~STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT~~

~~Not Applicable~~

~~REFERENCE TO A MICROFICHE APPENDIX~~

~~Not Applicable}~~

[[0004] This invention relates generally to the field of tattooing and tattoo machines. More particularly, the invention relates to an apparatus for securing the tube grip, which houses the needle bar and needle grouping, to the frame of a tattoo machine or intradermal injection device.]

BACKGROUND OF THE INVENTION

[[0005] Tattoo machines necessarily break the skin of the subject during the tattooing process, causing a risk of the spread of infectious diseases such as Hepatitis, HIV and AIDS. The standard in the industry therefore is to sterilize the tattoo machine before each use. In order to effectively and efficiently sterilize a tattoo machine, the components of the machine must be easy to remove, sterilize, and reassemble.

[0005.1] Prior art tattoo machines typically have a needle or needle grouping which extends through the tattoo machine frame and is driven by a motor to reciprocate linearly. A hollow cylinder or tube is attached] ~~{This invention pertains to the field of tattooing, and is intended to improve the method used, to secure the tube grip}~~ to the tattoo machine frame~~{. The tube grip houses the needle bar that holds}~~ [and] the needle grouping~~{, which moves into and out of the skin in the act of tattooing.~~

~~Because tattoos must be applied in a sterile manner, the }~~ [passes through the tube. A portion of the tube, often having a larger external diameter than the rest of the tube, has a gnarled outer surface. This portion is called a tube grip. The tube grip provides a gripable portion for the tattoo machine operator and also serves to guide the needle grouping and restrain lateral movement of the needle grouping. The] tube grip and needle ~~{groupings,}~~ [grouping] must be removable to allow them to be cleaned and sterilized. On all modern tattoo machines, the tube grip is a removable part.

[[0005.2]] Existing {tube vice} [tattoo machine] technology {uses} [employs] several methods to secure the tube grip to the tattoo machine frame{, but many of these methods} [which] tend to bend or crimp the cylindrical tube grip. The {Screw Tight Tube Vice Frame (shown in Figure 2) is designed to allow the tube grip to be secured to the frame with a simple twist and released with a counter twist. The Screw Tight Tube Vice Frame secures the tube grip in place just as securely as or more securely than existing technology, but will not bend or crimp} [present apparatus available not only tend to damage the tube grip, but are slow to remove and reinstall, and apparatus with multiple small screws are difficult to sterilize.

[0005.3] A more recently developed method of attaching the tube to the frame is a split portion of the frame which partially encircles the tube and is tightened with a wing nut. Tattoo machines are covered with a light plastic bag during operation to avoid contamination or cross-contamination between the operator and subject. Not only are such bags often ripped by the protruding wing nut, but the tattoo machine is rendered less streamline by the frame extension, wing nut and bolt required. The wing nut type vice does not apply pressure evenly to the tube grip, and may result in bending or crimping of] the tube grip.

BRIEF SUMMARY OF THE INVENTION

{The object of the Screw Tight Tube Vice Frame is to secure the tube grip to the frame }

[[0006] It is an object of the present invention to provide a secure, easy to assemble and disassemble and streamlined apparatus for attaching the tube grip and the tube housing needles in a tattoo machine to the frame of the tattoo machine] in a manner that improves on the methods currently {used by tattoo machines, while providing a housing for the tattoo machine components. The Screw Tight Tube Vice Frame consists of a tube vice frame, into which holes are drilled and tapped for attaching the frame to other tattoo machine

~~components, and a tube vice mechanism for attaching the tube grip to the frame. This tube vice mechanism allows the tube grip to be secured to the frame with a simple twist, and released with a counter twist,}~~ **[employed by tattoo machines.**

[0006.1] **It is a further object of the invention to provide a screw tight tube vice frame comprising a frame, a compression nut, a compressible ferrule and a receiving piece and a tube adapted such that the tube housing at least one needle may be inserted in the receiving piece, the ferrule slipped over the tube, and the nut slipped over the tube and pushed up against the ferrule, then screwed onto the receiving piece such that the ferrule is compressed and grips and retains the tube]** without bending or crimping it.

~~{This is important because the tube grip with}~~

[[0006.2] **It is yet a further object of the present invention to provide a tube vice frame that allows rapid and easy removal of the tube grip, tube and]** needle groupings ~~{is removed often}~~ to allow for cleaning and sterilization. **[It is a further object of the present invention to provide a]** ~~{BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING~~

~~Figure 1 shows the }~~ tattoo machine with ~~{the Screw Tight Tube Vice Frame.~~

~~Figure 2 shows the components of the Screw Tight Tube Vice Frame in detail.~~

~~DETAILED DESCRIPTION OF THE INVENTION~~

~~Components~~

The Screw Tight Tube Vice Frame consists of a tube vice frame and a tube vice mechanism, which attaches a tube grip of standard industry measurement to the frame. The tube vice mechanism may include a removable hollow threaded rod to house the compression ferrule, or the hollow threaded section that houses the compression ferrule may be cast or machined as part of the frame. The tube vice mechanism also includes a compression nut that is tightened around the compression ferrule to secure the tube grip to the frame, and loosened to release it from the frame. The specifications for the threaded rod and compression ferrule are as follows:

threaded rod: approximately 1/2" to 5/8" long, with 1-12-20 threading; the inside diameter of the hollow centre measures 5/16" or 11/64"

compression ferrule: usually measures 1/4" tall, with an inside diameter of 5/16"

Manufacturing and Assembly

The Screw Tight Tube Vice Frame may be made of metal (such as aluminum, brass, steel, or iron) or any other rigid material (such as plastic, fibreglass, or lexan). Holes are drilled in the tube vice frame as follows;

hole drilled for the upper binding post

hole drilled for the lower binder post

two holes drilled on the flat plane for the screws that secure the coils (one hole per coil)

~~drilled~~ and ~~tapped hole for the screw~~ that ~~secures the rear spring~~ saddle ~~to the frame~~).[a streamlined profile that is easily shrouded in plastic or other material without tearing the shroud.

[0006.3] Another object of the present invention is to provide an apparatus for securing a tube grip to be secured to or removed from a tattoo machine frame with a simple twist of a nut.

[0006.4] Another object of the present invention is to provide a method for manufacturing a screw tight tube vice frame that is efficient, inexpensive and creates a streamlined, easy to use vice frame on a tattoo machine which may be retrofitted to an existing tattoo machine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view of a tattoo machine with a screw tight tube vice frame according to the invention.

[0008] FIG. 2 is an exploded perspective view of the key components of the screw tight tube vice frame in detail.

[0008.1] FIG. 3 is a pre-assembly side detail view of a compression nut, ferrule and threaded rod according to the invention.

[0008.2] FIG. 4 is an assembled side detail view of a compression nut, ferrule and threaded rod according to the invention.

DETAILED DESCRIPTION AND PREFERRED EMBODIMENT

[0009] Figure 1 depicts the preferred embodiment of the apparatus for attaching a tube 20 and associated components to a frame 40 in a tattoo machine 100 in accordance with the present invention. Tattoo machines 100 are generally comprised of a frame 40, typically made of metal. Standard frames 40 have a lower binding post 52 and an upper binding post 50. There is also typically a coil mounting bracket 44 at the front portion of the frame 40, and a spring saddle 42 at the lower rear portion of the frame 40. At least one electromagnetic coil 60 is mounted on the coil mounting bracket 44. Preferably there are two coils, a front coil 60 and back coil 62. An armature bar 70 is attached to a spring 69 which extends from the spring saddle 42 and is adapted to reciprocate when AC power is applied to the electromagnetic coils 60 and 62 such that the armature bar 70 is alternately attracted and repelled by the coils 60 and 62, as is known in the art.

[0010] Also as is known in the art, a needle bar 24 is attached to the armature bar 70 and passes through the coil mounting bracket 44 to maintain stability. The needle bar 24 has at least one needle attached to the needle bar tip (not shown). A hollow housing or tube 20 is placed over the needle bar 24 to guide the reciprocating needle bar 24. The present invention relates generally to an apparatus for securing the tube 20 to the frame 40 of a tattoo machine 100, referred to herein as the screw tight tube vice frame 30.

[0010.1] A hollow threaded rod 14 extends from the mounting bracket 44 towards the active end or front of the tattoo machine 100. The tube 20 is inserted into the hollow rod 14. A compression ferrule (not shown) comprising a hollow split ring with beveled edges is slipped over the tube 20 to abut the inner surface of the hollow rod 14. A compression nut 12 with an internal taper is then slipped over the tube 20 to abut and surround the ferrule (not shown) and screw onto the rod 14 thereby securing the tube 20 to the frame 40.

[0011] A tube grip 16 consisting of a hollow cylinder with a gnarled outer surface, which is a known tattoo machine component, is the slipped over the tube 20 the tube grip 16 may also be an integral component of the tube 20. A tube tip 18 is then inserted in the open end of the tube grip 16. The tube tip 18, tube 20, and tube grip 16 are connected as a unit.

[0011.1] Referring now to Figure 2, an exploded perspective view of the key components of the screw tight tube vice frame are shown in detail.] The tube vice mechanism, which is used to attach a tube grip of standard industry measurement to the frame, is located on the front lower portion of the frame. ~~[It may include a removable hollow threaded rod to house the compression ferrule, or the hollow threaded section that houses the compression ferrule may be cast or machined as part of the frame.~~

~~If a removable threaded rod is used to house the compression ferrule, an internal taper is machined into the lower entrance of the threaded rod, starting at the outside diameter and machining inwards to a recommended depth of 1/8". The entry to the threaded rod is tapered internally to approximately the same degree as the, compression ferrule to allow the rod to house the ferrule. The threaded rod is attached to the tube vice frame by machining the frame as follows:~~

~~a hole measuring 29/64" in diameter is step drilled two thirds of the way into the front lower section of the frame~~

~~a secondary hole measuring 5/16" or 11/64" in diameter is drilled through the remaining one-third of the frame, using the same center point as the previous hole~~

~~the 29/64" hole is tapped with a 1/2 20 bottoming tap from the entrance of the hole, starting at the bottom of the frame and continuing through to the end of the step drilling (approximately)~~

[The frame 40 is shown fully exposed without the additional tattoo machine 100 components. The lower binding post hole 46 and upper binding post hole 48 are shown. In the preferred embodiment the hollow cylinder or rod 14 is removable from the frame 40. The inside surface of the rod 14 is internally tapered.

[0011.2] The compression ferrule 10 is a split ring or hollow cylinder preferably composed of a malleable metal such as brass. The ferrule 10 is tapered from each end to a central high point about the mid circumference of the ferrule 10. The ferrule 10 compresses as pressure is applied to the tapered ends such that the internal diameter of the ferrule 10 is reduced and the split or gap gradually reduced. The tapered ends of the ferrule 10 are preferable machined to the same angle as the taper on the interior surface of the rod 14, such that a mirrored mating surface is created between the ferrule 10 and rod 14.

[0011.3] The ferrule 10 is compressed between the rod 14 and the compression nut 12, which is a nut having interior threads matching those on the exterior surface of the rod 14, and preferably has a gnarled or otherwise textured exterior surface to provide a grip to the operator. The nut 12 also has an internal taper matching or mirroring that of the ferrule 10. The compression nut 12 is rotated in a clockwise direction to compress and lock the ferrule 10 in place.

[0011.4] The rod 14 is between approximately 1/2" to 5/8" in length and has a 1/2 20 threading, with an inside diameter of either 5/16" or 11/64". [0012]The compression ferrule 10 is optimally1/4" in length, with an inside diameter of 5/16 in an uncompressed state. The compression nut 12 must be sized to screw onto the rod 14.

[0014] The screw tight tube vice frame components may be manufactured from metal (such as aluminum, brass, steel, or iron) or any other rigid material (such as plastic,

fiberglass, or lexan). A malleable metal such as brass is used. Holes are drilled in the tube vice frame 40 as follows: a hole for the upper binding post, a hole for the lower binder post, two holes drilled in the coil mounting bracket to accept the screws 64 that secure the coils 60 and 62, and a drilled and tapped hole for the spring screw 68 that secures the spring 69 to the frame 40.

[0020] An internal taper is machined into the front entrance of the threaded rod 14, starting at the outside diameter and machining inwards to a depth which is optimally 1/8". The threaded rod 14 is tapered internally to approximately the same degree as the compression ferrule 10 to allow the rod 14 to house the ferrule 10. The threaded rod 14 is attached to the tube vice frame 30 by machining the coil mounting bracket 44 on the frame 40 as follows: 1. step-drilling a primary hole measuring approximately 29/64" in diameter] two-thirds of the way into the ~~{(frame)}~~ [front lower section of the coil mounting bracket 44. 2. Drilling a secondary hole measuring approximately 5/16" or 11/64" in diameter through the remaining one-third of the coil mounting bracket 44 using the same center point as the previous hole. The primary hole is tapped with a 1/2 20 bottoming tap from the entrance of the hole, starting at the front of the coil mounting bracket 44 and continuing through to the end of the step drilling (approximately two-thirds of the way into the coil mounting bracket 44).]

~~{the threaded rod }~~

[[0024] The threaded rod 14] is screwed into the threaded hole [(not shown) and protrudes approximately a 1/2" from the front of the frame coil mounting bracket 44.

[0024.1] In a variation to the preferred embodiment, the removable hollow threaded rod 14 may be cast or machined as part of the coil mounting bracket 44 on the frame 40, rather than as a removable component.

[0025]] If the hollow threaded {section} [rod 14] is cast as part of the frame [40], it protrudes approximately [a] 1/2" from the {bottom} [front] of the {frame} [coil mounting bracket 44] (the same length as the threaded rod [14], described above, would protrude once screwed into the {frame)} [coil mounting bracket 44)]. If the frame [40] is cut on a CNC mill, the hollow threaded {section} [rod 14] may also be machined into the frame [40], protruding approximately 1/2" from the bottom of the frame {(again the same length as the threaded rod or cast threaded section would protrude from the frame). The same taper (}[40. The same taper, machined to a] recommended depth of 1/8" {) applies} [should be used] whether a removable threaded rod [14] is used to house the compression ferrule [10] or the threaded {section} [rod 14] is cast or machined as part of the frame [40.

[0026] [The exterior surface of the brass] {The } compression ferrule {is usually made of a flexible material (often brass). It} [10] is tapered on both ends {;} [with] the tapers {meet} [meeting] in the middle [of the ferrule 10]. A slit is made vertically through {half of} the ferrule [10] to allow flexibility when it is compressed and tightened around the tube {grip} [20]. The compression ferrule [10] is placed into the hollow section of the threaded rod [14] or [machined] frame [component 14.

[0027]] The compression nut [12] is step drilled, drilled, and tapered to the same specifications as the threaded rod [14]. It may be machined from any type of metal. {It is} [The nut 12 has interior threads adapted to be] screwed onto the threaded rod [14] or threaded section [14] of the frame [40] that houses the compression ferrule {with a tightening} [10 by turning the nut 12 in a clockwise] motion to secure the tube {grip, or unscrewed in a loosening motion to release die tube grip.} [20, or conversely turning the nut 12 in an anti-clockwise direction to release the tube 20.]

{Function}

[[0028] Referring now to Figure 3, a pre-assembly side detail view of a compression nut 12, ferrule 10 and threaded rod 14 is shown. The arrows indicate the direction of connection of the nut 12 to the rod 14. The tapered lip of the interior surface of the rod 14 serves to compress the ferrule 10 thereby reducing the interior diameter of the ferrule 10.]

~~{When}~~

[[0028.1] Figure 4 shows an assembled side detail view of a compression nut, ferrule and threaded rod. The compressed ferrule abuts the tube 20 with its interior surface, thereby securing the ferrule 10 in place without bending, crimping or other damage to the tube 20.

[0028.2] In use, the sterilized, removable components are assembled as follows: the hollow rod 14 is screwed clockwise into the coil mounting bracket 44 on the frame 40, then the needle bar 24 is inserted through the frame 40 and attached to the armature bar 70. The tube 20 then slides over the active or distal end of the needle bar 24 and into the frame 40. The ferrule 10 slides over the tube 20 to seat against the distal end of the rod 14 and] the compression nut [12 is tightened clockwise to compress the ferrule 10 against the tube 20 thereby retaining it in the frame 40. The tube grip 16 slides over the tube 20, and is secured. The tube tip 18 is then inserted inside the distal end of the tube grip 16 and over the needle bar 24, and is secured to the tube grip 16.

[0029] When the compression nut 12] is turned clockwise in a tightening motion, the bevels [or tapers] make contact and slide over each other, creating pressure [evenly around the circumference of the taper] on the compression ferrule [10] and causing it to compress. The vertical slit [in the ferrule 10] provides ~~{greater room}~~ [a gap] for compression as the ends of the slit move toward each other, creating a squeezing effect and securing the tube ~~{grip to the frame.}~~ [20 to the frame 40 without bending or crimping it.]

~~(Turning)~~

[[0030] **After use of the tattoo machine 100,]** the compression nut **[12 is rotated]** counter-clockwise ~~(in a loosening motion relieves)~~ **[to relieve]** the pressure on the compression ferrule **[10]**, resulting in the release of the tube ~~(grip.~~

~~CLAIM~~

~~What we claim as our invention is the Screw Tight Tube Vice Frame as shown in Figure 2, including the cast or machined frame made of metal or other material, drilled and tapped where necessary; and the tube vice mechanism, which consists of the threaded rod or threaded frame section, compression ferrule, and compression nut.~~

~~ABSTRACT OF THE DISCLOSURE~~

~~On all modern tattoo machines, the tube grip is a removable part that houses the needle bar, which holds the needle groupings that move into and out of the skin in the act of tattooing. The tube grip and needle groupings must be removable to allow for)~~ **[20. The motion is easy to perform and avoids damage to the tube 20 which commonly occurs in prior art tattoo machines 100. The present invention is a streamlined apparatus due to the low profile, inline ferrule 10, rod 14 and nut 12 arrangement.**

[0030.1] The preferred embodiment and variations herein described are not intended to be exhaustive or to limit the scope of the invention to the precise forms disclosed. They are chosen and described to best explain the principles of the invention and its application and practical use to allow others skilled in the art to comprehend its teachings.

[0030.2] As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

ABSTRACT

An apparatus is disclosed for attaching a needle housing or tube to the frame of a tattoo machine which facilitates] cleaning and sterilization. [The apparatus, or tube vice, comprises a tube which houses a needle which moves in and out of the subject's skin during tattooing, a hollow cylinder, a split ring ferrule and a compression nut. The tube is inserted into the hollow cylinder and the ferrule slides over the tube. The ferrule, nut and the hollow cylinder have beveled edges which mate. The nut slides over the tube to screw onto the hollow cylinder thereby compressing the ferrule against the tube without bending or crimping the tube. A tube grip may be attached to the tube. A method of manufacturing the tube vice is also disclosed. The tube vice can be provided in kit format.] ~~(This invention is intended to improve the technology currently used by tattoo machines to secure the tube grip to the tattoo machine frame. Existing tube vice technology uses methods of securing the tube grip to the tattoo machine frame that tend to bend or crimp the tube grip. The Screw Tight Tube Vice Frame uses tube vice technology that secures the tube grip in place just as securely as or more securely than existing technology, but will not bend or crimp the tube grip. It includes a frame with holes drilled and tapped for attaching it to other components of a tattoo machine and a tube vice mechanism for attaching the tube grip to the frame. The tube vice mechanism allows the tube grip to be secured to the tattoo machine frame with a simple twist and released with a counter twist.)~~